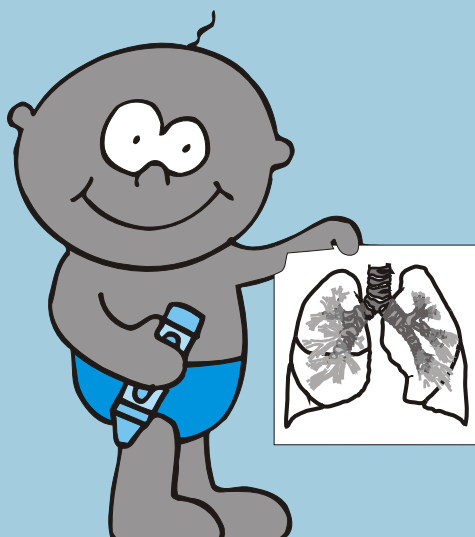


PRIORITIES IN CHILD HEALTH

Easily digestible information for
health workers on managing
the young child



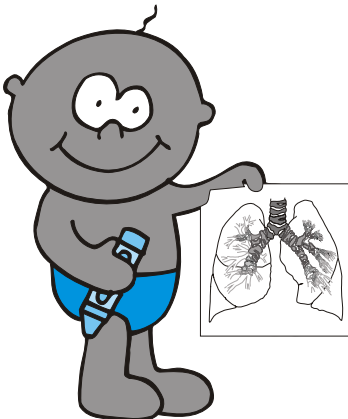
BOOKLET 3

ACUTE RESPIRATORY INFECTION

PRIORITIES IN CHILD HEALTH

Easily digestible information for
health workers on managing
the young child

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BOOKLET 3

**ACUTE RESPIRATORY
INFECTION**

FOREWORD

This series of booklets is a course of self-based learning on the comprehensive management of the sick infant and young child. It is intended for use by first level health workers who, in South Africa, are generally nurses. The principles used are based on the World Health Organisation strategy "Integrated Management of Childhood Illness (IMCI)". For those who have not yet benefitted from full IMCI training, the booklets provide specific information on important elements of child health care that each nurse should know and use. As her knowledge and experience expands, she will increasingly approach each child in the comprehensive manner promoted in this series. The booklets are not intended as a substitute for existing training programmes, but rather as an adjunct to such learning.

Short case studies are employed to illustrate problems to be discussed in each section.

Introduction to comprehensive management

<i>Booklet 1</i>	<i>Underlying principles</i>
	<i>The Road to Health Chart</i>
	<i>Nutrition</i>
	<i>Maternal well-being</i>
<i>Booklet 2</i>	<i>Immunisation</i>

Management of the sick child under 5 years

<i>Booklet 3</i>	<i>Acute respiratory infection</i>
<i>Booklet 4</i>	<i>Diarrhoeal disease</i>
<i>Booklet 5</i>	<i>Promoting healthy growth</i>

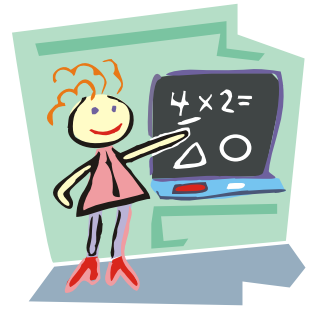
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After reading this booklet the learner should :

- Be able to identify children with acute respiratory infection who need urgent management and referral
- Be able to assess, classify and treat the child with an acute respiratory infection
- Know how to teach the mother or carer how to give treatment at home
- Describe the various types of respiratory infection

Before you start, why not test your knowledge by answering the following questions!



QUESTIONS ON BOOKLET 3

Are the following statements true or false? If false, correct them!

- I. 1. Pertussis is most dangerous in babies under 6 months.
2. Antibiotics are often indicated for the common cold.
3. Bronchiolitis is caused by H. influenzae
4. Breathing is rapid if over 40 per minute in a child of 18 months.
5. Viral Croup may be prevented by immunisation.
6. A child with cough and indrawing of the chest must be referred to hospital.
7. A child who shows stridor while sleeping should always be referred.
8. Cough which gets worse on exercise may be a symptom of asthma.
9. Children should be given paracetamol to ease a cough.
10. You should give penicillin for a sore throat if the neck glands are enlarged and tender.
- II. 11. A temperature below 35.5°C is a danger sign in young infants.
12. Wheezing is best treated with aminophylline by mouth.
13. Stridor may be caused by the larval stage of worms.
14. Erythromycin is the best treatment for pertussis.
15. Penicillin allergy is commonly caused by ampicillin.
16. A child showing symptoms suggestive of acute allergy to penicillin should be given adrenalin 1:1000 subcutaneously.
17. Decongestant nasal drops are not generally indicated for babies.
18. The pneumococcus is the commonest cause of pneumonia.
19. Pneumonia can be managed at home.
20. More than one attack of pneumonia may mean a foreign body in the lung.

Answers on page 34

ACUTE RESPIRATORY INFECTION (ARI)

THE CHILD FROM TWO MONTHS TO FIVE YEARS

In this and subsequent Booklets we will discuss common and important illnesses and their management in the child from two months to five years of age. **The sick infant under two months presents rather different problems, and will be dealt with in a separate booklet.**

FIRST OF ALL, IN CASE YOU'VE ALREADY FORGOTTEN, WHAT DO WE MEAN BY 'INTEGRATED MANAGEMENT'?

'Integrated' means made 'whole' or 'complete'. At any encounter with a sick child we do not consider only the presenting illness, but the whole child - his or her illness, nutrition, exposure to risks, protection, status of parents, family, social factors, and living circumstances, in order to promote good health.

THERE ARE FOUR COMPONENTS TO EVERY ENCOUNTER WITH A SICK CHILD. WHAT ARE THEY?

- ASSESS and CLASSIFY the health problem.
- TREAT the child.
- COUNSEL the mother or caregiver.
- ENSURE GOOD FOLLOW-UP.

FIRST YOU SHOULD FIND OUT HOW ILL THE CHILD IS.

ARE THERE
ANY GENERAL
DANGER
SIGNS?



IDENTIFYING THE VERY ILL CHILD

WHAT ARE THE DANGER SIGNS?

ASK

- Is the child unable to drink or breastfeed?
- Does the child vomit everything ?
- Has the child had convulsions ?

LOOK

- Is the child lethargic or unconscious?
- Is the child convulsing at present?
- Are there bleeding spots in the skin?

A CHILD WITH ANY DANGER SIGN NEEDS URGENT ATTENTION AND REFERRAL.

WHAT SHOULD YOU DO?

COMPLETE ASSESSMENT AND TREATMENT IMMEDIATELY SO THAT REFERRAL IS NOT DELAYED.

Management when danger signs are present is discussed further for specific illnesses.

WHAT ARE THE FIRST QUESTIONS YOU ASK THE MOTHER OR CARER WHEN ASSESSING THE CHILD AND THE HEALTH PROBLEM?

- What is the child's problem?
- Is this a first visit or a follow-up visit?

IF THE FIRST VISIT, ASK ABOUT THE MAIN SYMPTOMS



WHAT ARE THE MAIN SYMPTOMS LIKELY TO BE?

- Does the child have a cough or difficulty with breathing?
- Does the child have diarrhoea?
- Is the child vomiting?
- Does the child have fever?
- Does the child have an ear problem?
- Is there another problem?

These are the commonest symptoms for which a young child is brought to a health facility.

ASSESSING NUTRITION

THEN CHECK FOR MALNUTRITION AND ANAEMIA

- Look for visible severe wasting.
- Look for oedema of both feet, if present
REFER (Booklet 5).
- Look at the palms of the hands, tongue and conjunctivae.
 - Is there severe pallor?
 - Is there some pallor?
 - Check haemoglobin if pallor is present.



WEIGH, PLOT AND LOOK AT THE WEIGHT LINE ON THE ROAD TO HEALTH CHART

- Is there growth faltering?
 - Is weight gain satisfactory or is there poor weight gain?
 - (Weight curve flattening or dipping? See Booklet 5).

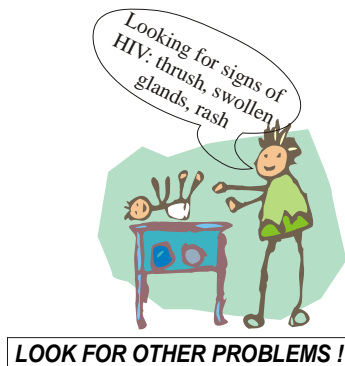
WHAT OTHER PROBLEMS SHOULD YOU BE ON THE LOOK-OUT FOR?

ALWAYS CONSIDER HIV/AIDS IN A MALNOURISHED CHILD

- Is there severe thrush?
- Are the lymph glands enlarged?
- Is there a rash?

ALWAYS CONSIDER TB

- Is there a known contact with anyone with TB ?



NOTE WELL! HAVE YOU CHECKED THE CHILD'S AND THE MOTHER'S IMMUNISATION STATUS?!

- Is it up to date for the age?
- If not, the deficiencies should be corrected before they go home.

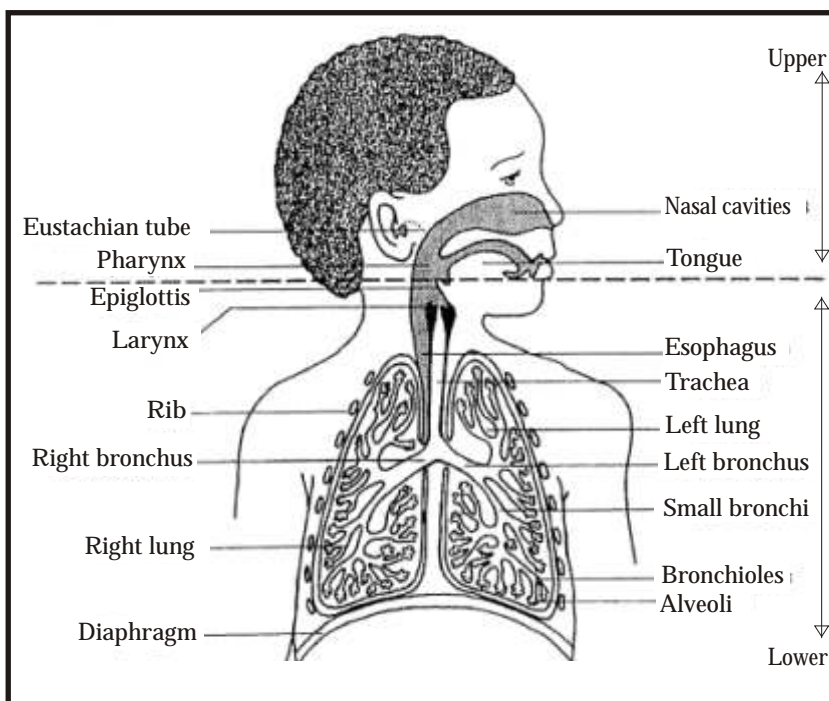
SOUTH AFRICAN NATIONAL IMMUNISATION SCHEDULE

<u>AGE</u>	<u>VACCINE</u>	<u>SITE</u>
AT BIRTH	BCG POLIO 0	Right arm Oral
6 WEEKS	POLIO 1 DTPHiB 1 Hep B 1	Oral Left thigh Right thigh
10 WEEKS	POLIO 2 DTPHiB 2 Hep B 2	Oral Left thigh Right thigh
14 WEEKS	POLIO 3 DTPHiB 3 Hep B 3	Oral Left thigh Right thigh
6 MONTHS	(MEASLES IN HIGH RISK SITUATIONS)	
9 MONTHS	MEASLES 1	Right thigh
18 MONTHS	BOOSTERS : POLIO 4 DTP 4 MEASLES 2	Oral Left arm Right arm
5 YEARS	BOOSTERS : POLIO 5 DT 1	Oral Left arm

UPPER AND LOWER RESPIRATORY INFECTIONS

THE CHILD WITH A COUGH

Coughs and colds are the commonest child infections encountered by the health worker. A child can easily catch five to eight such infections a year due mostly to viruses. The vast majority are minor and self-limiting. It is our job to recognise those that are more serious and treat them appropriately. Cough may be caused by irritation or inflammation anywhere along the respiratory tract.



(Adapted from WHO/ARI/90.5)

If the cause is in the nose or throat, this is termed upper respiratory. These infections are often mild, but some need treatment to prevent them from getting worse.

From the larynx down to the lungs and pleura is termed lower respiratory. Lower respiratory infections are the most dangerous. Most deaths from acute respiratory infection are due to pneumonia - that is infection of the lungs.

WHAT ARE THE FIRST QUESTIONS TO ASK WHEN A CHILD IS BROUGHT TO YOU WITH A COUGH?

- What is the child's age in months ?
- How long has cough been present?
- Is the child playing normally?
- Is the child drinking normally?
- Is there any breathing difficulty?
- Is the breathing rapid?
- Has she/he choked on anything ?
- Has she/he gone blue ?

WHY ARE THESE QUESTIONS THE MOST IMPORTANT?

Age:

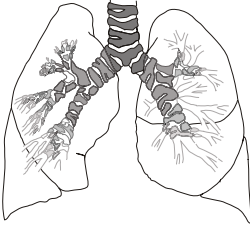
The younger an infant with a cough is, the more watchful must we be. An infant under three months may have an infection carried over from birth, or some other serious problem. An infant under four to five months is at higher risk for apnoea or sudden infant death. Babies under 12 months are especially susceptible to bronchiolitis, which causes severe breathless non-rapid breathing.

Duration of cough:

Most simple coughs associated with cold symptoms have disappeared or are much improved after seven to ten days. Any cough which has lasted more than two weeks should be viewed with greater suspicion. A cough which has been there for a month or more **MUST** be investigated further.

Playing and feeding:

A good indication of how ill the child is can be obtained from these questions. Is he or she still playing and interested in activities round about? Is feeding normal or only slightly affected? If so, serious illness is unlikely. On the other hand inability to drink at all is a serious danger sign demanding immediate action.



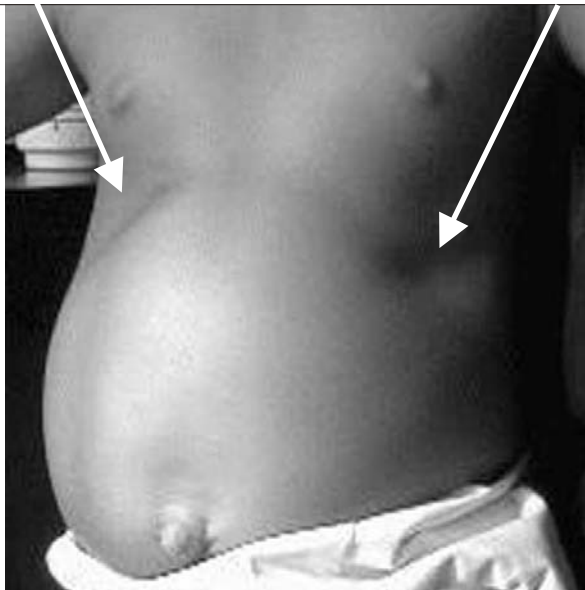
WHAT IS BREATHING DIFFICULTY?

This separates the simple cold and sore throat, where there is no breathing difficulty, from disorders lower down the respiratory tract.

Breathing difficulties are of various types :

- **Stridor** (a crowing noise on breathing in), means there is some obstruction in or around the larynx.
- **Wheeze** - a prolonged whistling sound on breathing out. Breathing out takes more time than usual, and this means obstruction in the smaller bronchi.
- **Indrawing** - pulling in of the lower chest wall when the child breathes in.
- **Rapid breathing** (tachypnoea).

NOTE THE INDRAWING OF THE LOWER CHEST WALL ON BOTH SIDES WHEN HE BREATHE IN



HOW DO YOU TELL IF THE BREATHING IS RAPID?

Under 2 months	:	60 breaths or more per minute.
2-12 months	:	50 breaths or more per minute
over 12 months	:	40 breaths or more per minute.

It should be noted that these figures apply to the child who is lying quietly. Healthy babies when active can show breathing patterns in the "abnormal" range.

Rapid breathing is the most important sign of pneumonia. It may also be due to other factors, but rapid breathing is always a significant sign which should never be ignored.

WHAT OTHER FACTORS CAN CAUSE RAPID BREATHING?

- When the blood is too acid (metabolic acidosis) the child breathes quickly and deeply to try to get rid of the excess acid in the form of carbon dioxide. This is seen most commonly with diarrhoea and is a sign of severe dehydration. (See **Booklet 4** for management).
- High temperature causes increased metabolism and this can also result in rapid breathing. **DON'T FORGET THAT MALARIA CAUSES HIGH FEVER!**

ABOUT BREATHING DIFFICULTY (CONTINUED)

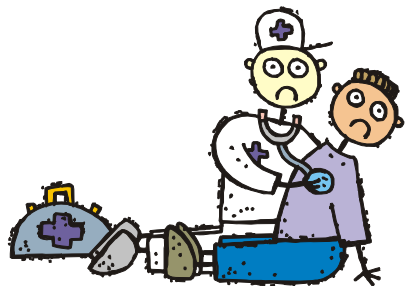
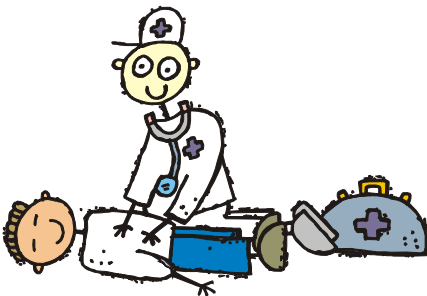
Here are 2 other sounds you may hear:

- A snoring noise in the back of the nose and throat (stertor), is often present in babies with colds, and is usually of little importance. If persistent, action may be needed - stertor may indicate enlarged adenoids.
- Grunting, a short sound due to release of air after the glottis (the space between the vocal cords) is opened after being held closed, followed by a short inspiratory phase. It is a danger sign, usually indicating severe pneumonia and often pleurisy (inflammation of the lining of the lung).

WHAT OTHER SIGNS OF SERIOUS RESPIRATORY ILLNESS MAY THERE BE?

- Not playing or feeding. These have already been mentioned under general danger signs. A baby with an upper respiratory infection may be irritable and feverish, but will still interact socially, play a little and feed. Absence of this normal behaviour is serious.
- Cyanosis. Has the baby gone blue? This is obviously a symptom/sign indicating an emergency.
- Choking. Always bear in mind the possibility of an inhaled object or feed in a child who is very distressed and making violent but ineffective respiratory movements. There will be marked indrawing of the chest wall and probably cyanosis.

Looking at, and feeling the child's fully unclothed chest can provide more information than listening to it with a stethoscope.



WHAT MAY OBSERVATION SHOW?

Observation may show :

- RAPID BREATHING
- INDRAWING of the lower chest on inspiration
- ASYMMETRY (unequal movement of the two sides) on breathing

Let us now return to **Vusi**, whom we first introduced in **Booklets 1 & 2**.

After visiting the health facility three weeks ago, Vusi aged 10 months, developed measles. Just when the rash was fading and he seemed a little better he again became feverish and began coughing and breathing quickly. His mother brings him back to the health facility.

You assess him for general danger signs and acute respiratory illness. You find out that:

- He has lost weight (1.2kg), is feeding poorly and very weak.
- The temperature is 39°C and respirations 56 per minute.
- The lower part of his chest wall is drawn in as he breathes.
- His lower legs are swollen and the skin peeling.

HOW WOULD YOU CLASSIFY VUSI?

- Vusi has one general danger sign - his very poor feeding.
- Vusi shows both severe weight loss and oedema of the feet; he has severe malnutrition.
- After giving him urgent treatment he must be admitted to hospital as soon as possible.
- Vusi's mother has told you that he is coughing a lot and has difficulty in breathing.

HOW DO YOU NOW PROCEED?

- Count the breaths in one minute (child must be calm):
 - Is the child breathing fast?
- Look for chest indrawing.
- Look and listen for stridor or wheeze.

THEN CLASSIFY THE ACUTE RESPIRATORY ILLNESS

HOW DO YOU DO THIS?

IF THERE IS

- *Any danger sign*
- *Chest indrawing OR*
- *Stridor in a calm child*

CLASSIFY AS "SEVERE PNEUMONIA " OR VERY SEVERE DISEASE

IF THERE IS

- *No danger sign*
- *Rapid breathing*
- *No chest indrawing*
- *No stridor*

CLASSIFY AS "PNEUMONIA "

IF THERE IS

- *No danger sign*
- *No rapid breathing*
- *No stridor*
- *No chest indrawing*

CLASSIFY AS "NO PNEUMONIA " - COUGH or COLD or SOME OTHER CAUSE

MANAGING THE THREE CATEGORIES OF ACUTE RESPIRATORY ILLNESS

SEVERE PNEUMONIA

Vusi has a respiratory rate of 56, and indrawing. He also has severe malnutrition and one general danger sign. So he has severe pneumonia, a very severe disease. How would you manage him?

He must be REFERRED urgently to hospital.

HOW DO YOU MANAGE A CHILD WHO NEEDS REFERRAL?

- Give 40% oxygen by:
face mask at 4 litre/min OR nasal prongs at 1 litre/min
- Give first dose of an antibiotic:
Ampicillin 20mg/kg IM
- Keep young infant warm in a blanket if cold:
(temperature below 35.5°C)
- Treat fever.
- Treat wheeze, if present.
- If dehydrated, give extra fluid.
- REFER to hospital on oxygen.

PNEUMONIA

HOW WOULD YOU MANAGE PNEUMONIA (NOT SEVERE)?

Pneumonia can be managed at home provided you can be sure of follow-up.

- Give antibiotic.
- Give treatment for fever.
- Give treatment for wheeze, if present.
- Advise mother.
- Follow up.



GIVING AN ANTIBIOTIC

- Amoxicillin is the most suitable antibiotic for lower respiratory infections in this age group.
- Give child 5 ml (125 mg) eight hourly by mouth (or 10 ml eight hourly if weight is over 20 kg).
- Give the first dose of amoxicillin in the health facility.
- Then instruct the mother on how to give amoxicillin eight hourly (three times a day) for five days at home.
- Advise her to return if child has not improved in 24 hours.

HOW DO YOU TREAT THE FEVER?

- Axillary temperature above 37.5° means fever.
- Fever alone is not a reason to give an antibiotic, except in a young infant less than three months.
- Give paracetamol (10-15 mg/kg/dose) if temperature is above 38.5°.
- Repeat the dose every four hours if necessary:
 - 3-12 months 2.5- 5.0 ml
 - over 12 months 5.0- 10.0 ml
- Advise mother to give extra fluids.
- Axillary temperature below 35.5° - or if the baby feels cold - means low body temperature. **THIS IS A DANGER SIGN IN YOUNG INFANTS.**



WHAT WOULD YOU DO FOR A BABY WITH A LOW TEMPERATURE?

Advise the mother to cover the infant's head and feet and dress with extra clothing. Skin-to-skin contact (Kangaroo care) is a good way to keep a baby warm. If there is no response, and/or if there are other danger signs, REFER.

HOW DO YOU TREAT WHEEZING?

- Give Salbutamol by inhalation
 - via a metered dose inhaler and spacer
 - OR via a nebuliser

To find out how to do this see **Further Reading page 33**.

THEREAFTER

- If this is a first attack of wheezing occurring with an acute respiratory infection, continue with salbutamol by mouth at home.
- If there is a history of recurrent wheezing, REFER.

HOW WOULD YOU TEACH THE MOTHER OR CARER TO GIVE PARACETAMOL AND AMOXYCILLIN AT HOME?

- Determine the correct drugs and dosage for the child's age and weight.

<u>AGE OR WEIGHT</u>	<u>PARACETAMOL</u>	<u>AMOXYCILLIN</u>
2-12 MONTHS (UNDER 10KG)	100mg 4-6 hourly	125mg * 8 hourly
12M - 5 YEARS (10-19KG)	150mg 4-6 hourly	125-250mg * 8 hourly
(*20 -40 mg/kg/day)		

- Tell the mother the reason for giving the drug to the child.
- Demonstrate how to measure a dose.
- Watch the mother practise measuring a dose by herself.
- Ask the mother to give the first dose to her child.
- Explain carefully how to give the drug, then label and package it.
- If more than one drug will be given, collect, count and package each drug separately.
- Explain that all the tablets or syrups must be used up to finish the course of treatment, even if the child gets better.
- Check the mother's understanding before she leaves the health facility.

WHAT IS THE DANGER OF AN ALLERGIC REACTION WHEN GIVING AMOXYCILLIN?

PENICILLIN ALLERGY

If there is a history of possible penicillin allergy give erythromycin instead of amoxycillin or penicillin.

Fortunately, penicillin allergy is rarely a problem when amoxycillin is given by mouth.

Children with known allergies should be watched for 20 minutes before leaving the clinic. The earlier symptoms develop after taking the antibiotic, the more serious is the reaction likely to be.

The most severe type of allergy to penicillin and other drugs is called an anaphylactoid reaction. The symptoms are flushing of the skin, urticaria, severe anxiety, coughing, wheezing, cyanosis, and shock. The major cause of death is swelling (oedema) of the larynx.

WHAT WOULD YOU DO IF YOU ENCOUNTERED A CASE?

- Give adrenalin 1: 1000, 0.3-0.5 ml intramuscularly immediately. This can be repeated every 20 minutes if necessary.
- Give an antihistamine (e.g. promethazine, 0.25-0.5 mg/kg) intramuscularly, if available, otherwise by mouth.
- Give oxygen by facemask or nasal cannula with flow rate of 1 litre/minute.
- Then REFER urgently.

WHEN WOULD YOU ADVISE HER TO RETURN TO THE CLINIC?

IMMEDIATELY

- if child is not able to breastfeed or drink.
- becomes sicker.

AFTER TWO DAYS

- if there is pneumonia, wheezing or croup.

WHAT FOLLOW-UP CARE WOULD YOU GIVE?

- Check the child for general danger signs.
- Assess for cough or difficult breathing.
- Ask: is there improvement in eating, breathing, fever?
- If chest indrawing, or general danger signs, give dose of different antibiotic and REFER.
- If no improvement or worse, REFER.
- If improving, complete the five days of antibiotic.
- **Remind the mother to give one extra meal daily for a week.**
- **Counsel the mother on her own health, if indicated.**

NO PNEUMONIA

THERE IS NO PNEUMONIA. HOW WOULD YOU MANAGE THE CHILD?



- Assess and treat ear problem or sore throat, if present.
- Treat fever if present.
- Treat wheeze, if present.
- If there is no improvement after seven days, REFER.
- If coughing for more than four weeks :
 - Is it whooping cough? (See page 23).
 - Treat for worms.
 - Assess for TB. Do a Tine test, and send for a chest X -ray.

UPPER RESPIRATORY INFECTION

You now know how to classify acute respiratory infections into three broad categories, how to manage each category, and when to REFER. Let us now consider a few further case studies.

COMMON COLD

Isobel, aged six months, presents with a one-day history of runny nose, sneezing, coughing, poor feeding, but no fever and little general illness. When you examine her the baby looks well-nourished and well. The breathing rate is 48 per minute and the only finding is a watery nasal discharge.

WHAT TREATMENT WOULD YOU GIVE?

Isobel has the commonest form of ARI. The common cold is usually due to a 'nose' virus (rhinovirus) of which there are many different strains, so that we seldom become immune to all of them. Many other viruses also cause upper respiratory infection. In addition to the watery nasal discharge there may be the additional symptoms of sore throat, cough, fever, headache and aches and pains.

- Give paracetamol (2.5ml three or four times a day) to reduce fever (if present) and make her feel better.
- Give normal saline or bicarbonate of soda nose drops to help allay nasal congestion.
- Encourage intake of fluids in frequent small amounts.

HOW WOULD YOU ADVISE THE MOTHER TO MAKE UP THE NOSE DROPS?

1/4 of a teaspoonful of salt or sodium bicarbonate dissolved in a cupful of warm water. Drop two drops into each nostril with a dropper four times a day.

WOULD YOU GIVE DECONGESTANT NASAL



DROPS?

Decongestive nose drops should not be used. Giving them for more than a day or two can result in symptoms becoming even worse when the effects of the nose drops wear off (a rebound effect). Oral decongestants, such as Demazine and Actifed, can be given where nasal obstruction during sleep is troublesome, but their use should be restricted to children older than one year.

IN WHAT SITUATIONS SHOULD ANTIBIOTICS BE GIVEN IN AN UPPER RESPIRATORY INFECTION?

Antibiotics of any sort are **NOT** indicated in the child with a viral upper respiratory infection. However, colds may be complicated by bacterial infection of the ears, throat or sinuses. This should be suspected in a child with prolonged fever or if symptoms do not disappear in a few days.

Give amoxycillin if :



- earache develops.
- the throat and/or tonsils are very red, and the glands under the angles of the jaw tender.
- there is fever and purulent nasal discharge. (This suggests sinus infection).

For treatment of these conditions, see Standard Treatment Guidelines. EDL.

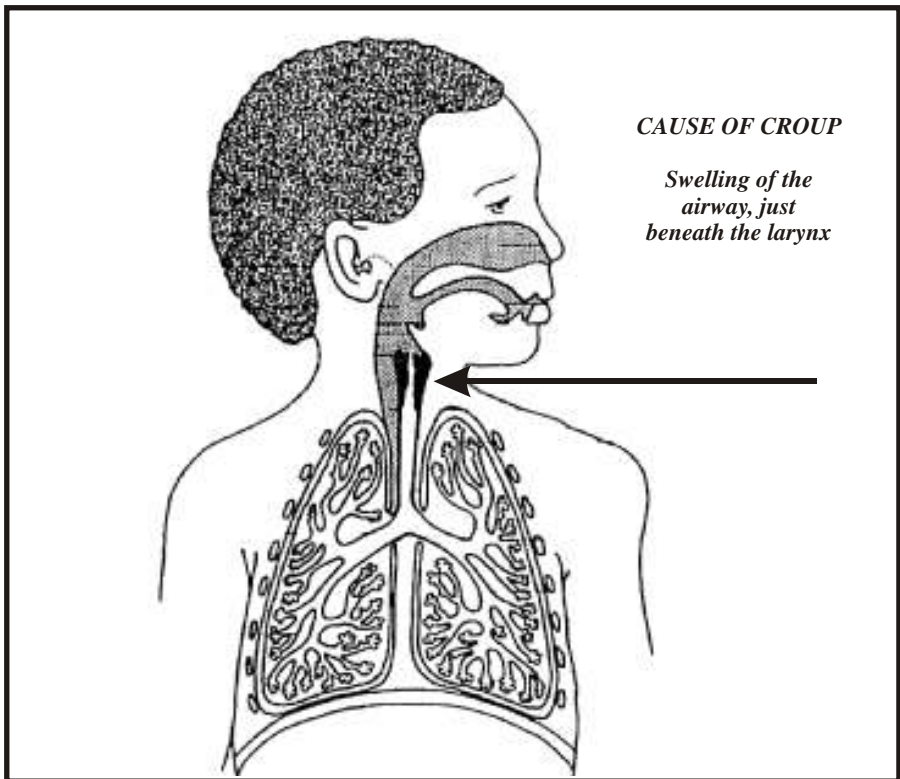
CROUP

Hendrik, aged eight months, has symptoms of a cold and a fever of 38.2°C for a day. He then develops a dry barking cough and a crowing noise on breathing in. His breathing is 42 per minute.

WHAT IS THE LIKELY DIAGNOSIS?

CROUP (ACUTE LARYNGOTRACHEOBRONCHITIS)

WHAT IS THE CAUSE OF CROUP?



There is swelling of the airway, just beneath the larynx (see arrow), which results in a dry barking cough and a crowing sound on breathing in.

With more severe obstruction there is also difficulty in breathing out. The most common organisms causing croup are all VIRUSES. Young children between the ages of six months and four years are affected.

HOW WOULD YOU MANAGE THE CASE?

In most children croup is mild, but it can get worse rapidly. Many children will have a barking cough, but only show stridor when crying. If stridor is constantly present in a calm child who is not crying, it is safer to REFER.

HOW WOULD YOU MANAGE HENDRIK'S CROUP WHILE YOU ARE WAITING FOR TRANSPORT, OR IF REFERRAL IS NOT POSSIBLE?

- Try to keep him comfortable and happy to avoid crying.
- Give paracetamol for fever.
- Continue oral feeds in frequent small amounts.
- Mist may have a soothing effect, but be careful with steam kettles!
- Corticosteroids have been shown to be beneficial; give dexamethazone 0.5mg/kg IM or prednisolone 2mg/kg orally as single dose. If no improvement, repeat after 24 hours.
- *IF IN DOUBT REFER.*

WHAT WOULD YOU DO IF THE CROUP BECOMES MORE SEVERE?

- Admit urgently to hospital if possible.
- An endotracheal tube or tracheostomy may be required.
- Before the child leaves for hospital:



- ✓ Give oxygen by face mask or nasal prong.
- ✓ Nebulise adrenalin (1 ml of 1/1000 with 1ml saline).
- ✓ Repeat every 15-30 minutes if necessary.

REFER ANY CHILD WITH
PERSISTENT STRIDOR

LOWER RESPIRATORY INFECTION

WHOOPIING COUGH (Pertussis)

Nomonde, an infant of five months, develops a cold and cough. After five days the cough is worse rather than better, so that she is coughing in continuous bouts during which she becomes red in the face. At the end of a bout of coughing she vomits and sometimes stops breathing for a few seconds. On examination the breathing is 56 per minute and there is no indrawing.

WHAT DIAGNOSIS SHOULD YOU SUSPECT?

When there are uncontrollable spasms of coughing, each spasm ending in a long 'crowing' indrawing of breath, or in vomiting, suspect Pertussis. In young babies the spasm may end by stopping breathing altogether, rather than with a whoop. These attacks are dangerous and can be fatal.

WHY SHOULD PERTUSSIS OCCUR IN AN INFANT AS YOUNG AS THIS?

Young infants are highly susceptible, because, in contrast to other infections such as measles and tetanus, no immunity is transferred from the mother.

WHAT IS THE CAUSE OF PERTUSSIS?

A bacterium, *Bordetella pertussis*.

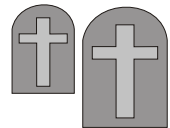
WHAT ARE THE CLINICAL FEATURES?

- An incubation period of seven days. The disease may be contracted from an adult, in whom symptoms are often very mild - just an 'ordinary' cough.
- The early phase, with symptoms and signs of upper respiratory infection, lasting about a week.
- The phase of coughing spasms.
 - An uncontrollable spell of coughing is followed by an indrawing of breath - the whoop.
 - Infants may stop breathing altogether. These dangerous periods of 'apnoea' may end in death.
 - In some children feeding induces severe coughing and vomiting.

- There are thick sticky secretions, and inhaling these readily leads to collapse of a lobe or pneumonia.
- The severe straining can lead to tearing of the little skin under the tongue, haemorrhages in the eye, and even to intracranial bleeds.
- The convalescent phase.

There is gradual lessening of the spasms after two to four weeks, but the cough may last for two to three months ('100-day cough'). There is often a recurrence with subsequent upper respiratory infections.

WHAT ARE THE COMPLICATIONS OF PERTUSSIS?



- Pertussis is still a major killer and cause of morbidity.
- Along with measles and tetanus, pertussis it is responsible for nearly two million deaths annually world-wide.
- The most serious complications are:
 - * death during a spasm
 - * bronchopneumonia
 - * brain damage
 - * weight loss and debility due to recurrent vomiting, leading to malnutrition and progressive tuberculosis
 - * chronic lung disease in later life.

HOW WOULD YOU TREAT NOMONDE? REFER because:

- There is persistent vomiting.
- She is under 12 months.
- Pneumonia is present.

Erythromycin should be given in the catarrhal phase, or if the cough is in its first few weeks, but it will not stop the spasms once they have developed. **Give erythromycin 125-250 mg four times a day (25-50 mg/kg/day) for 10 days.**

- Salbutamol syrup is commonly used (0.3mg/kg/day).
- Sedatives are not recommended.
- **Immunisation would have prevented it, or made the course of pertussis milder.**

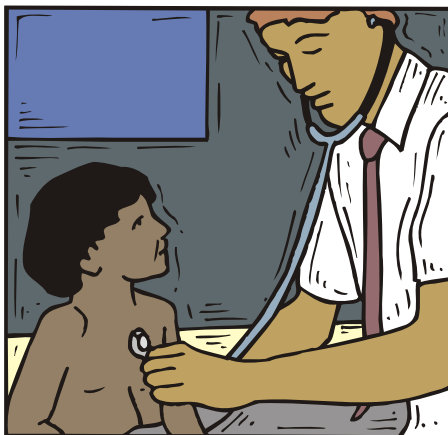
Faizel, a 2-year-old boy, has recovered well from an upper respiratory infection, but is still coughing both by day and at night a week later. A few wheezes and coarse crackles, which disappear on coughing, are audible in the chest. There is no chest indrawing. The breathing is 36 per minute. He is otherwise well and not feverish.

WHAT IS THE LIKELY CAUSE?

BRONCHITIS

Many children show mild symptoms of bronchitis with upper respiratory infections. The wheezing noises, or rhonchi, are produced by air passing through secretions in the larger airways. Attacks may recur with colds. Smoking in the household, or smoky environments due to wood or coal fires, or primus stoves are often aggravating factors.

ASTHMA should always be considered if attacks are recurrent, if wheezing and cough at night are severe, or if the child becomes more tight-chested after exercise. However, many children grow out of the attacks, and do **not** turn out to be asthmatic.



WHAT IS YOUR MANAGEMENT?

Warn about the harmful effects of smoking anywhere near the child and of the harmful effects to everyone else! An oral bronchodilator, such as salbutamol syrup is often helpful; aminophylline preparations should be avoided.

ANYTHING ELSE YOU SHOULD CONSIDER AS A CAUSE OF WHEEZING?

· **WORMS** (*particularly round-worms - larval pneumonitis*) can also cause wheezing. The tiny larvae of roundworms (ascaris) and certain other worms circulate through the lungs before they develop into mature worms. With repeated infections, allergy to the larvae develops

causing wheezing. The larvae may also be trapped in the lungs, resulting in bouts of pneumonia.

WHAT TREATMENT WOULD YOU GIVE IF YOU SUSPECT WORMS ARE THE CAUSE?

In children over one year of age, give mebendazole 100mg (tablets or syrup) twice daily for three days. If under one year, REFER.

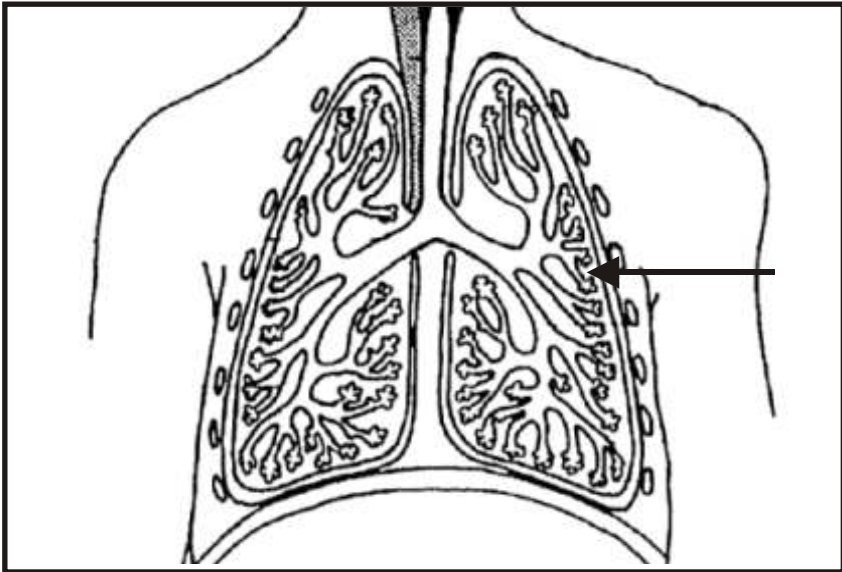
Rebecca, seven months, shows symptoms of a cold. The next day she is distressed, with



increasing difficulty with breathing, an audible wheeze on expiration, frequent cough. The chest is expanded and there is indrawing of the lower chest wall. Respiratory rate is 48 per minute. The temperature is normal.

WHAT IS THE LIKELY DIAGNOSIS?

BRONCHIOLITIS



This is a viral infection affecting predominantly the tiniest branches of the bronchial tree (See arrow).

The virus most commonly responsible, and the cause of outbreaks, particularly in winter, is the respiratory syncytial virus. Other viruses also cause sporadic cases of bronchiolitis throughout the year.

WHAT ARE THE CLINICAL FINDINGS?

The chest is barrelled (expanded) due to air-trapping, and percussion over the sternum shows loss of cardiac dullness. There is indrawing of the lower ribs and soft tissues above the sternum on inspiration, but no stridor, and expiration is prolonged. Air entry is equally poor on both sides on auscultation, with an expiratory wheeze and few if any crackles.

WHAT TREATMENT WOULD YOU GIVE?

- Oxygen, by nasal prong, head-box or mask.
- Fluids by mouth in frequent, small amounts, or nasogastrically 60 ml/kg/day.
- If condition causes concern try salbutamol by inhalation.
- REFER if no improvement, or if any danger signs present.

SHOULD YOU GIVE AN ANTIBIOTIC FOR BRONCHIOLITIS?

Generally not, as the cause is a virus. However, if the baby is:

- Under three months of age.
- Malnourished.
- HIV positive, or if HIV infection is suspected.

Amoxycillin should be added. In such children secondary bacterial infection (broncho-pneumonia) readily complicates viral bronchitis. But in any event *THESE CHILDREN SHOULD BE REFERRED.*

There is no place for *aminophylline* or corti-costeroids in *bronchiolitis*.

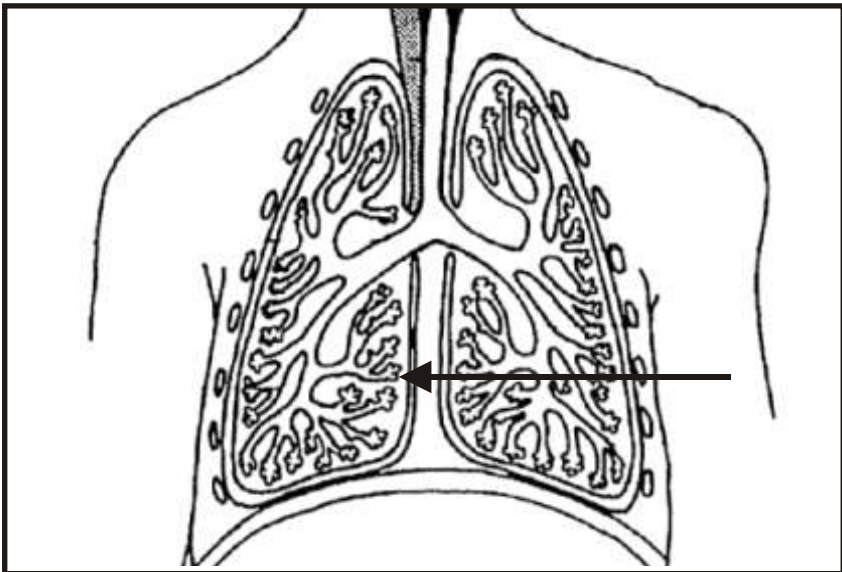
Note Rebecca's expanded chest and indrawing of the lower chest wall.



Warren, 5 years, develops sudden high fever and cough and complains of pain in the left upper abdomen. His temperature is 38.8, pulse 120 and he shows rapid respirations at 48 per minute. There is no indrawing of the lower chest. Palpation of the abdomen shows nothing of note.

WHAT IS THE LIKELY CAUSE? Rapid breathing over 40 means

PNEUMONIA



Pneumonia is an infection starting in the tiny air sacs of the lung (the alveoli) or in the tissues around the air sacs (see arrow).

It may involve a single lobe or segment of a lobe, or be more generalised in both lungs.

WHAT ARE THE MOST IMPORTANT BACTERIA CAUSING PNEUMONIA?

The *pneumococcus* is the commonest cause of pneumonia with a lobar or segmental pattern. Certain strains of *Haemophilus influenzae* are also important causes of lower respiratory infection. The *staphylococcus* can cause severe *pneumoma*.

Viruses and mycobacteria can cause similar appearances on X-ray.

In HIV/AIDS an important cause of pneumonia is *Pneumocystis carinii*, an unusual organism, partly fungus, partly protozoan.

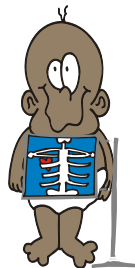
HOW WOULD YOU TREAT WARREN'S PNEUMONIA ?

- Amoxycillin, 250 mg p.o. three times a day for five days.
- Analgesia with paracetamol as instructed on pages 15-16.

WHAT ADVICE WOULD YOU GIVE HIS PARENTS?



- Give extra fluids by mouth.
- He must be seen again after two days.
- An X-ray after two weeks is useful to make sure the pneumonia is resolving.
- He should be given an extra meal a day for two weeks, when he is better.



WHAT ARE THE POSSIBILITIES IF THE BOY FAILS TO RESPOND TO TREATMENT?

- Wrong treatment, i.e. a resistant organism.
- Infected fluid has collected in the pleural cavity.
- TB may be the cause.

These are all indications for REFERRAL to hospital.

WHAT ARE POSSIBLE CAUSES OF REPEATED ATTACKS OF PNEUMONIA?

- An inhaled foreign body.
- Aspiration of milk or food (gastro-oesophageal reflux).
- HIV infection or other causes of immunosuppression.
- Chronic lung diseases.
- The child may have asthma.

Children who have had more than one attack of pneumonia must always be REFERRED for further investigation.

SUMMARY OF MANAGEMENT

GENERAL DANGER SIGNS

- Child unable to drink?
- Lethargic or unconscious ?
- Vomiting everything ?
- Had or having convulsions ?

GIVE PRE-REFERRAL TREATMENT, THEN *REFER*.

IS BREATHING RAPID?

- Under 2 months >60.
- 2-12 months >50.
- Over 12 months >40.

SEVERE PNEUMONIA

- Chest indrawing.
- Rapid breathing.



First dose of antibiotic, keep warm, treat fever and/or wheeze, give extra fluids, REFER.

PNEUMONIA

- Rapid breathing.

Give antibiotic, treat fever, wheeze, advise on follow-up. REFER if no better in two days.

NO PNEUMONIA*

Treat at home. REFER if no better in seven days.

* COMMON COLD	Treat at home; paracetamol, saline nose drops
* SORE THROAT	Treat at home; paracetamol, amoxycillin orally, or penicillin orally or IM
* EAR INFECTION	Treat at home; paracetamol, amoxycillin orally. REFER if no improvement in 48 hours
* CROUP	REFER if stridor in calm child
* PERTUSSIS	Treat at home; give erythromycin; REFER if under 12 months; if persistent vomiting; if pneumonia present
* WHEEZING	Try oral salbutamol; if no better, give salbutamol by inhalation. If no response to two inhalations, 30 minutes apart, REFER
* BRONCHIOLITIS	Give oxygen, oral fluids, salbutamol by inhalation. If no improvement, REFER

SEVERE MALNUTRITION AND SEVERE ANAEMIA

REFER. Pre-referral: Give Vitamin A, treat low blood sugar, keep warm.

ANAEMIA AND LOW WEIGHT

Deworm; give iron; antimalarial if at risk; counsel on feeding; advise when to return.

FURTHER READING

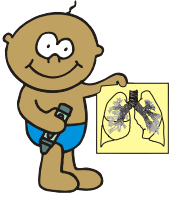
Coovadia HM, and Wittenberg DR Paediatrics and Child Health: A Manual for Health Professionals in the Third World. 4th Edition. Oxford University Press. Cape Town. 1998.

Standard Treatment Guidelines and Essential Drugs List. National Department of Health 1998.

World Health Organisation Programme for the Control of Acute Respiratory Infections. Acute Respiratory Infection in Children: Case Management in Small Hospitals in Developing Countries. A Manual for Doctors and Other Senior Health Workers. WHO Geneva. 1990.

BEFORE THE CHILD GOES HOME FROM THE CLINIC, MAKE SURE THAT:

- *HE OR SHE IS FULLY IMMUNISED*
- *THE MOTHER HAS RECEIVED NUTRITIONAL ADVICE*
- *THE MOTHER CAN REPEAT THE INSTRUCTIONS IN HER OWN LANGUAGE*
- *THE MOTHER KNOWS WHEN TO COME BACK*



ANSWERS

- | | | |
|-----|---|---|
| 1 | - | T |
| 2 | - | F |
| 3 | - | F |
| 4 | - | T |
| 5 | - | F |
| 6 | - | T |
| 7 | - | T |
| 8 | - | T |
| 9 | - | F |
| 10. | - | T |
| 11. | - | T |
| 12. | - | F |
| 13. | - | F |
| 14. | - | T |
| 15. | - | F |
| 16. | - | F |
| 17. | - | T |
| 18. | - | T |
| 19. | - | T |
| 20. | - | T |

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NOTES

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

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